

Appendix F
Activity Hazard Analysis

Appendix F List

AHA Landfill Gas Extraction and Treatment System Installation
AHA Sampling of Landfill Gas Monitoring Probes and Extraction Wells
AHA Trenching and Excavation

Activity Hazard Analysis

Activity: Landfill Gas Extraction and Treatment System Installation

Author/Initial Review: J Moser

Final Review: Dr. R. Von Burg

This task includes drilling, installation of connective piping to LFG treatment system and wellhead to connector pipe, construction/installation of treatment pad and system, and flow extraction testing.

Hazards expected during this phase of work include: Material Handling - load and unload of equipment, Work on uneven surfaces, Use of hand tools, Noise, Heat Stress, safety expectations, Dust, Flora/fauna, Motor Vehicles, exposure to LFG

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> • Mobilization/Demobilization 	<ul style="list-style-type: none"> • Physical: Injury from heavy equipment; heavy lifting. Pinch points; slip, trip, and fall hazards. 	<ul style="list-style-type: none"> • Train equipment operators. • Wear hi-vis vests and hard hats • Minimize work and personnel in vicinity of equipment. • Keep feet and hands clear of moving/suspended materials and equipment.
<ul style="list-style-type: none"> • General field activities/Brush clearing 	<ul style="list-style-type: none"> • Cuts, slashes, dismemberment • Potential encounter with animals, poisonous plants, snakes and insects. • Slip, trip, and fall hazards from uneven surfaces, animal holes, dropped equipment/tools. • Contact with heavy equipment. • Repetitive-motion. 	<ul style="list-style-type: none"> • Keep personnel in area to a minimum • Use caution with wild animals; learn to recognize poisonous plants, wear insect repellent. • Watch and be aware of potential hazards like holes, tools, etc. • Wear PPE assigned by the SSHO including gloves, face shield or goggles, and hi-vis vest. • Maintain safe distance between workers. • Provide ergonomic training, institute good housekeeping procedures

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ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> • Drilling Operations • Changing flights/installing extraction wells • Decontamination/Pressure washing/Steam cleaning 	<ul style="list-style-type: none"> • Contact with heavy equipment, vehicle traffic, noise • Dermal contact with contaminated soils. • Contact with rotating augers • Inhalation exposure to VOCs and other gases • Dermal contact with contaminated soils and water • Physical contact with pressurized streams (injection hazard) • Physical contact with hot water/steam/objects 	<ul style="list-style-type: none"> • Drill rig will be equipped with two (2) easily accessible emergency shut down devices: one for the operator and one for the helper. • Minimize personnel in area of operating equipment • Provide auger guards. Use-long-handled shovels to remove cuttings. Observe safety precautions required for rotating augers.. • Periodically monitor/test the atmosphere with the real time instruments to make sure vapors are not collecting on the ground at unsafe levels. • Stage equipment for decontamination securely • Separate contaminated and decontaminated equipment into the proper zones. Cleaned equipment shall not be stored in the EZ or CRZ. • Decontamination stations shall be located at least 10 feet or more from operating equipment.

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ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	<ul style="list-style-type: none"> Burns and flying debris 	<ul style="list-style-type: none"> Wear PPE assigned by the SSHO. PPE for decontamination may include face shields, material guards, chemical resistant coveralls, latex or nitrile gloves At no time with a pressure washer to be used on decon personnel
<ul style="list-style-type: none"> Heavy Equipment Operation (drill rig/backhoe/trenching equipment/fork lift) Loading/hauling operations Fueling 	<ul style="list-style-type: none"> Physical contact with moving equipment, flying debris, vehicle traffic, dust, noise. Uneven terrain Heavy lifting of pipes, fittings and/or equipment Fire, exposure to fuel vapors Dust 	<ul style="list-style-type: none"> Inspect equipment daily for safe operation Equipment shall not be allowed to run unattended. Use only trained operators and use seat belts at all times Assess any uneven terrain for proper equipment support and positioning Minimize personnel in area of operating equipment All vehicles and equipment will have back up alarms Secure and cover loads. Only UL/FM-approved safety cans shall be used to store fuel Do not fuel near an ignition source Do not fuel equipment while it is operating

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ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
		<ul style="list-style-type: none"> • Fire extinguishers shall be readily available • Stand upwind during fueling. • Wear proper PPE and Hi-visibility safety vests assigned by the SSO
<ul style="list-style-type: none"> • Repair of Geomembrane • Cutting/welding/installing boot assembly and geomembrane 	<ul style="list-style-type: none"> • Any physical or chemical hazard associated with specific task • Fumes, burns, heavy lifting repetitive motion • Inhalation exposure to VOCs and other gases 	<ul style="list-style-type: none"> • Review specific components of this Hazard Analysis and institute proper control measures for the specific activity • Inspect welding equipment daily for proper maintenance and operations • Observe ergonomic precautions regarding lifting and repetitive motion • Periodically monitor/test the atmosphere to make sure vapors are not collecting on the ground at unsafe levels. • Wear PPE assigned by the SSO
<ul style="list-style-type: none"> • Construction of LFG extraction and treatment system • Cutting/welding/installing HDPE pipe • Excavating/grading/laying down base rock/pouring concrete • Fence Installation 	<ul style="list-style-type: none"> • Any physical or chemical hazard associated with specific task • Fumes, burns • Heavy lifting of pipes, fittings and/or equipment 	<ul style="list-style-type: none"> • Review specific components of this Hazard Analysis and institute proper control measures for the specific activity • Inspect welding equipment daily for proper maintenance and operations • Observe ergonomic precautions regarding lifting and repetitive motion • Wear PPE assigned by the SSO

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ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none">Installing electrical components	<ul style="list-style-type: none">Fire, explosion hazards, electrocution	<ul style="list-style-type: none">Implement lockout/tagout proceduresWork to be conducted by qualified/certified electricianWork and materials will conform to the latest rules of the National board of Fire Underwriters' Code, regulations of the State Fire Marshal, and applicable local/state codes.

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PPE TO BE USED	MONITORING REQUIREMENTS	OTHER REQUIREMENTS
<ul style="list-style-type: none"> • Level D PPE • Street clothes or coveralls, • Steel-toed work boots (except UXO personnel), Safety glasses, Hearing protection (if necessary), Hardhat, Leather gloves 		<ul style="list-style-type: none"> • Meet training requirements below • Upgrade to Modified Level D if working in areas with poisonous plants.
<ul style="list-style-type: none"> • Modified Level D PPE • If additional skin protection from poisonous plants is required, then upgrade Level D PPE ensemble to modified Level D PPE to include: Tyvek™ coveralls with elastic wrists and ankles, Nitrile gloves (inner), splash shield (if necessary). 	<ul style="list-style-type: none"> • Periodically monitor/test the atmosphere for CO, H₂S , and other hydrocarbons to make sure vapors are not collecting on the ground at unsafe levels. 	<ul style="list-style-type: none"> • Upgrade to Level C if monitoring shows the presence of VOCs or other gases above action limits
<ul style="list-style-type: none"> • Level C PPE • Same protective equipment as Modified Level D with the addition of a full faced APR. 	<ul style="list-style-type: none"> • Periodically monitor/test the atmosphere to make sure vapors are not collecting on the ground at unsafe levels. • Monitor for heat and cold stress 	<ul style="list-style-type: none"> • Medically cleared and certified to wear a respirator and trained in the proper use and care of respirators

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• EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> • Drill rigs • Backhoes • HDPE Fusion cutter/fusion machine • Compressors • Hydrostatic testers • Water truck • Fire extinguishers • LEL/H₂S meter/PID • Delineators/Barricades/Signs • Radios • Hand tools • Steam cleaners (pressure washers) • First Aid Kits • Eyewash Stations 	<ul style="list-style-type: none"> • Pre-maintenance checks of equipment and documented inspection check off lists. • Proper registrations and certifications for equipment and equipment operators. • Proper certifications of workers on the site. • Underground utility inspections. • Daily inspection of the project site by the site superintendent. • Daily calibration of PIDs. • Battery check for LEL/H₂S meter. 	<ul style="list-style-type: none"> • 40 hour HAZWOPER trained • Additional 8 hours Supervisor training. • 3 days of supervised hazardous waste site experience. • Bloodborne pathogens training • Competent person for trenching and excavation • Mobilization and site-specific orientation. • Tailgate Safety Meetings • Hazard communication • Instruction on Manufacturer's safety requirements for equipment assigned, • Training on specific jobs, tools or equipment. • First-aid/CPR (2 individuals on site)

Activity Hazard Analysis

Activity: Sampling of Landfill Gas Monitoring Probes and Extraction Wells

Author/Initial Review: J Moser
Final Review: Dr. R. Von Burg

This task includes purging and sampling of probes and wells using LFG Analyzer and Summa canisters.

Hazards expected during this phase of work include: Work on uneven surfaces, Use of hand tools, Noise, Heat Stress, safety expectations, Dust, Flora/fauna, Motor Vehicles, exposure to LFG

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> • Mobilizing and equipment staging 	<ul style="list-style-type: none"> • Pinch points; slip, trip and fall hazards • Biological hazards, insects, snakes, animals and poison oak • Heavy lifting • Fire 	<ul style="list-style-type: none"> • Good housekeeping practices shall be performed. • Keep work areas picked up and clean as feasible. • Use proper PPE • Avoidance procedures in SSHP • Use proper lifting techniques • Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift • Fire extinguishers shall be readily accessible and maintained.
<ul style="list-style-type: none"> • Purging and sampling 	<ul style="list-style-type: none"> • Inhalation exposure to VOCs and other gases • Potential encounter with insects (e.g. spiders) that have made homes inside the protective casing and vaults. • Contact with potentially contaminated materials and gas 	<ul style="list-style-type: none"> • Stay upwind when opening protective casing and vaults • Test the atmosphere before purging and sampling to make sure vapors are not at unsafe levels • Wear PPE assigned by the SSSH. Upgrade PPE when directed by SSSH • Perform remote venting during purging • Wear nitrile gloves during purging and sampling • Inspect protective casing and vaults for insects

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ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> • Moving and shipping collected samples 	<ul style="list-style-type: none"> • Heavy lifting • Slip, trip and fall hazards 	<ul style="list-style-type: none"> • Proper decontamination procedures shall be followed • Label all containers. • Use proper lifting techniques • Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift • Good housekeeping practices shall be performed • Keep work areas picked up and clean as feasible • Label all containers • Store collected sample containers in secure area.

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PPE TO BE USED	MONITORING REQUIREMENTS	OTHER REQUIREMENTS
<ul style="list-style-type: none"> • Level D PPE (hardhat, safety vest, safety glasses, steel toed boots, hearing protection) 	<ul style="list-style-type: none"> • Periodically monitor/test the atmosphere for VOCs and other gases 	<ul style="list-style-type: none"> • Meet training requirements below
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> • Hand tools, radios • Sampling equipment (probes, collection pipe/tube, sampling pump and sample containers) • Project vehicle. 	<ul style="list-style-type: none"> • Equipment calibration • Pre-maintenance • Visual prior to use • Post-maintenance. 	<ul style="list-style-type: none"> • Hazardous waste operations (40 hour HAZWAPER and 8 hour refresher training) • Hazard communication training • Site safety orientation • Daily tailgate safety meeting.

Activity Hazard Analysis

Activity: Trenching and Excavation

Author/Initial Review: J Moser
Final Review: Dr. R. Von Burg

This task includes trenching/excavation of connective piping to LFG treatment system wellheads to connector pipes.

Hazards expected during this phase of work include: Material Handling - load and unload of equipment, Work on uneven surfaces, Use of hand tools, Noise, Heat Stress, safety expectations, Dust, Flora/fauna, Motor Vehicles, exposure to LFG

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<ul style="list-style-type: none"> • Mobilization/Demobilization 	<ul style="list-style-type: none"> • Physical; Injury from heavy equipment; heavy lifting • Pinch points; slip, trip and fall hazards 	<ul style="list-style-type: none"> • Train equipment operators. Minimize personnel in vicinity of equipment. Provide ergonomic training • Institute good housekeeping procedures; keep feet/hands clear of moving /suspended materials and equipment.
<ul style="list-style-type: none"> • Heavy Equipment Operations 	<ul style="list-style-type: none"> • Contact with heavy equipment, vehicle traffic, overhead utility lines, underground utilities 	<ul style="list-style-type: none"> • Inspect equipment daily for safe operating conditions. Do not use faulty equipment. Minimize personnel in area of equipment use • Use lockout/tagout during repairs, manual lubrications, securing attachments and/or refueling operations. • Getting on or off equipment while it is in motion is prohibited. Do not permit equipment to operate unattended
<ul style="list-style-type: none"> • Excavation Operations (Manual) 	<ul style="list-style-type: none"> • Falling into trench and trench collapses 	<ul style="list-style-type: none"> • Stay clear of the excavation. Nobody shall enter the excavation • Store spoils a minimum of 4 feet away from excavation edge. Excavations greater than 4 feet shall use sloping or benching, etc. • Utilize shoring for excavations deeper than 5 feet in depth.

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<ul style="list-style-type: none"> • Level D PPE (hard hat, safety vest, safety glasses, steel toed boots, hearing protection) 		<ul style="list-style-type: none"> • Meet training requirements below
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> • Vehicles • Fire extinguishers, First aid kits • Blocking, bracing and shoring materials • Manual hand tools • Mechanized equipment • Geophysical instrumentation • Personal Protective Equipment (PPE) • Communications equipment 	<ul style="list-style-type: none"> • Daily preventative maintenance and operational checks • First aid kits and fire extinguishers • Daily trench and excavation inspections 	<ul style="list-style-type: none"> • 40-hour HAZWOPER • 8-hour refresher training • UXO personnel EOD training • Tailgate safety meetings • Site-specific orientation • Poison oak awareness training • Trench and excavation competent person